



Case report

Candida albicans spondylodiscitis following an abdominal stab wound: Forensic considerations



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ABSTRACT

Candida albicans spondylodiscitis is a fungal infection of the spine which is still unusual in spite of the increasing frequency of predisposing factors. A 22-year-old man received an abdominal stab wound during a physical assault. Initial medical care included surgery, prolonged use of indwelling vascular catheters with administration of broad-spectrum antibiotics, and hospitalization in intensive care. Two months after the event, the victim experienced back pain in the right lumbar region and septic spondylodiscitis secondary to *C. albicans* was diagnosed three weeks later. This case is noteworthy because of its clinical forensic context. In France, the public prosecutor orders a medico-legal assessment after an assault for all living victims in order to establish a causal relationship between the assault and its complications. In our case, the patient presented numerous risk factors for candidemia and the forensic specialist reasonably accepted that the causal relationship was certain but indirect. We have only found one published case of spondylodiscitis after an abdominal penetrating injury and the pathogenic agent was not mentioned. We have found no case reported in a forensic context. This unusual observation shows that it may be genuinely difficult to prove the causal relationship between an abdominal penetrating injury and an unusual infectious complication such as fungal spondylodiscitis.

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1. Introduction

Septic spondylodiscitis is an infection of the intervertebral disc space and the vertebral body. Infection may extend to the paravertebral area, the epidural space and adjacent vertebral bodies.¹ Fungal infections of the spine are rare and occur primarily as opportunistic infections in relatively immunocompromised patients. They represent 1% of cases of non-tuberculous spondylodiscitis in adults and usually involve *Aspergillus* species (spp.), *Candida* spp. and *Cryptococcus neoformans*.^{1–3} *Candida* spp. are saprophytic fungi that inhabit the skin and mucous membrane of humans.⁴ Osteomyelitis due to *Candida* spp. is still unusual in spite of the increasing frequency of predisposing factors. A review of the literature found only 77 cases between 1970 and February 2003, and the spine was most commonly affected (31 cases, 40.3%).⁵ Miller and Mejicano reported only 59 cases of *Candida* spp. vertebral osteomyelitis between 1966 through October 2000.⁶

We report a case of *Candida albicans* spondylodiscitis following an abdominal stab wound and discuss the interest of medicolegal assessment, in particular in order to establish the causal relationship between the initial injury and its complications.

2. Case report

A 22-year-old man with no particular past medical history was the victim of a physical assault. An unknown assailant inflicted a stab wound with a 15-cm knife blade and also gave the victim several fist blows on the head. At the emergency department, physical examination showed a 1-cm long, straight-edged linear wound of the lower left abdomen. Multislice computed tomography (MSCT) with contrast injection revealed major hemoperitoneum. Immediately after the MSCT scan, the patient presented hypovolemic shock which required hospitalization in intensive care. Two indwelling vascular catheters were used for fluid replacement and blood transfusion. When the patient's condition was stabilized, he underwent exploratory laparoscopy. The surgeon noted injury of the second part of the duodenum and section of the right gastro-epiploic and middle colic arteries. The arteries were ligatured and duodenal exclusion with gastro-jejunal anastomosis

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and cholecystectomy were performed. A drain was inserted and the patient was hospitalized for 10 days. A medico-legal assessment took place two days after the assault in order to determine an initial duration of disability. The forensic expert concluded on a predictable period of 10 days.

Two months after the event, the victim experienced back pain in the right lumbar region. MSCT investigation showed posterolateral bone avulsion of the left L1 vertebral body. Neurological examination was normal and C-reactive protein (CRP) was within the normal range. Secondary displaced fracture was erroneously diagnosed. Morphine analgesics and a lumbar support belt were prescribed. Three weeks later, another MSCT scan followed by magnetic resonance imaging (MRI) examination were performed due to persistence and aggravation of the back pain. The MSCT scan showed numerous irregular osteolytic cavities in L1 and L2 vertebral bodies and destruction of the inferior endplate of L1 and the superior endplate of L2 (Fig. 1). This appearance was highly suggestive of septic spondylodiscitis. MRI findings were typical of spondylodiscitis. Gadolinium-enhanced T1-weighted MRI indicated increased signal intensity at L1–L2 vertebral bodies associated with infiltration of soft paravertebral tissues (Fig. 2). Furthermore, clinical examination noted a weight loss of 15 kg since the onset of symptoms and laboratory tests revealed increased CRP. The patient was hospitalized in the rheumatology department for one month. He was treated with morphine analgesics and a non-steroidal anti-inflammatory drug. At admission, blood cultures were negative and antifungal and broad-spectrum antibiotic therapy (ceftriaxone, metronidazole and fluconazole) were also given. L1 and L2 biopsies were positive for *C. albicans* and the patient was given a two-month course of oral fluconazole, 400 mg per day. He wore an orthopedic corset for one month. The medical team observed a favorable course with decreased pain and normalization of laboratory tests. Two months after the onset of the symptoms, the vertebral and paravertebral lesions were seen to be stabilized on MSCT scan. A second medico-legal assessment took place in order to establish the causal relationship between the initial injury and the complications, and to determine the final duration of disability.

3. Discussion

Sharp force injuries are relatively frequent in urban violence. They are well documented as a cause of death, representing the second cause of death by homicide in the United States and the primary cause in Europe, Africa and Asia.⁷ Epidemiological data on living victims are sparse, but the consequences and complications of these injuries are well known. In particular, infection is the leading complication of penetrating abdominal trauma. Infections

occur in 10–15% of cases and are mainly abscesses, peritonitis and gaseous gangrene.^{8,9} We found only a single report of spondylodiscitis after an abdominal penetrating injury, but the pathogenic agent was not mentioned.¹⁰ Furthermore, fungal infection has been rarely suggested as a cause of vertebral osteomyelitis.^{4,11} We found no reports of such cases in a forensic context, and obtaining proof of a causal relationship between an abdominal penetrating injury and an infectious complication such as fungal spondylodiscitis could be a genuine difficulty.

In France, the public prosecutor orders a medico-legal assessment after an assault for all living victims. The aims of assessment are to establish a causal relationship between an assault and the injury sustained and to determine the duration of disability.

Concerning diagnosis, imaging studies are essential for assessing features that are characteristic of certain infectious causes. MSCT is widely used but MRI has become the imaging modality of choice.³ However, the radiological aspects of *Candida* spp. have rarely been described and probably present no specificity.¹² Routine laboratory tests are also non-specific, whereas identification of the pathogenic agent is mandatory in order to establish a diagnosis. For cases of spondylodiscitis secondary to *Candida* spp., blood cultures are reported to be positive in 60%, while 95% of percutaneous or open disc biopsies are positive.^{1,2} Skaf et al. proposed recommendations for diagnosis in a patient presenting with subacute or chronic low back pain when non-pyogenic spondylodiscitis is suspected. These recommendations were: 1/obtain an MRI scan of the spine with gadolinium; 2/if the scan shows findings consistent with spondylodiscitis, blood cultures and antigen detection tests should be ordered; 3/a CT-guided fine needle aspiration and bone biopsy should be performed if the preliminary studies were negative; 4/a non-diagnostic aspirate should prompt an open bone biopsy for cultures and pathological examination.³ In our case the diagnosis was certain. It was suspected on MRI scan and confirmed by bone biopsy.

Concerning pathogenesis, spinal infections can occur through two routes of transmission. The first, when spondylodiscitis is preceded by infection elsewhere, is through hematogenous spread from a distant focal site. The second is through contiguous spread from a soft-tissue infection or by direct inoculation.^{3,13–15} Discussion on the route of contamination is important to determine the causal relationship. The evaluation of this causal relationship is very important in medico-legal context. In our case there was no possible contiguous spread between the trajectory of the injury and L1–L2 lumbar vertebrae, so contiguous or direct inoculation was excluded. However, we noted that the victim presented several of the generally accepted risk factors for candidemia, except immunosuppression, diabetes and intravenous drug use. These risk factors are present in nearly 90% of cases and include surgical

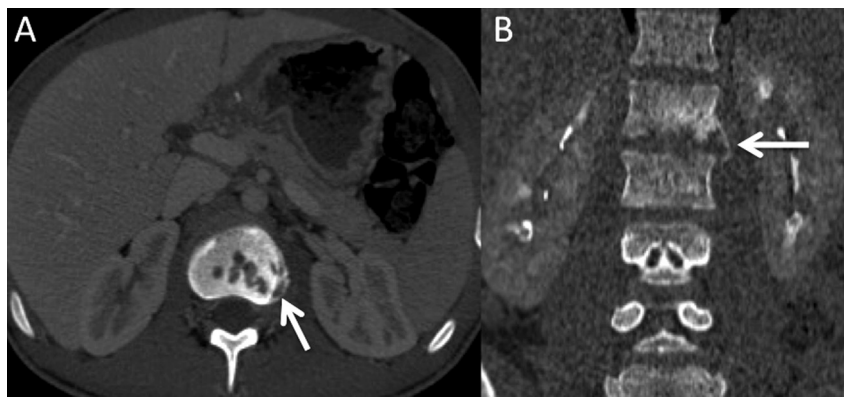


Fig. 1. Multislice computed tomography (MSCT) examination, 11 weeks after the assault. (A) Axial view: irregular osteolytic cavities in superior L2 endplate (arrow). (B) Frontal multi-planar reconstruction (MPR): destruction of inferior L1 and superior L2 endplates (arrow).

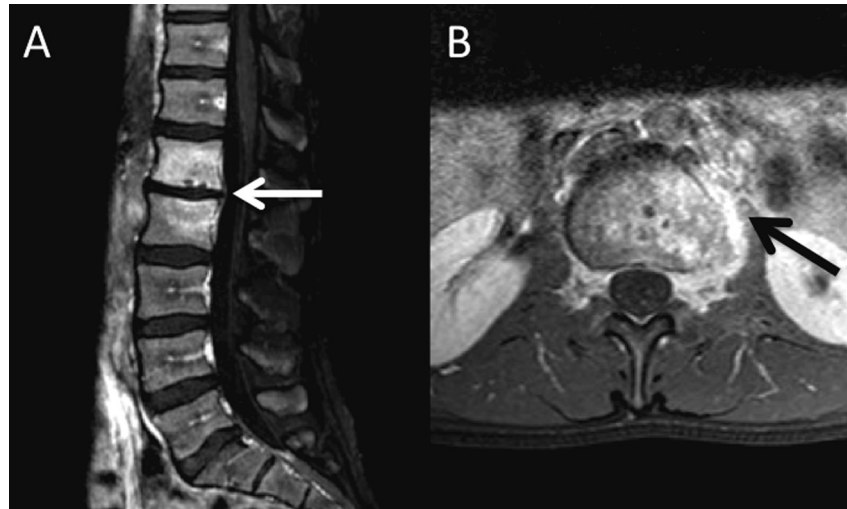


Fig. 2. Gadolinium-enhanced T1-weighted magnetic resonance imaging (MRI) examination, 11 weeks after the assault. (A) Sagittal view: increased signal intensity in L1-L2 vertebral bodies (arrow). (B) Axial view: infiltration of soft paravertebral tissues on the left (arrow).

intervention, prolonged use of indwelling vascular catheters, administration of broad-spectrum antibiotics and hospitalization in intensive care unit.^{1,16,17} All of these predisposing factors for candidemia were related and due to primary wound treatment. Usually, all of these therapies are necessary for such injuries. Also, the time elapsing between candidemia or exposure to risk factors and the onset of symptoms is not precisely defined, but it may vary from two weeks to over a year, which was consistent with our case.^{2,18} Thus we concluded causal relationship between abdominal stab wound and candida spondylodiscitis.

Concerning the duration of legal disability, most authors recommend an initial 2–4 weeks of bed rest, after which the patient is mobilized with a brace, corset or lumbar support belt.¹ In our case, forensic experts retained a disability period of 1 month and 10 days, which corresponded to the duration of hospitalization.

The specific feature of this case is its medico-legal context. It is noteworthy in showing that sharp force injuries can be followed by severe infectious complications, raising difficulties in clinical forensic practice to establish the causal relationship between an assault and its complications.

Ethical approval

Not required.

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Conflict of interest

None declared.

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